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ABSTRACT

This study explores aspects of the hypothesis that communication in cooperative learning groups mediates effects of cooperative learning. The study develops a taxonomy of the cooperative communications of groups of predominantly Anglo and Hispanic elementary school students attending a public school where teachers were being trained to implement the cooperative learning methodologies of "Finding Out/Descubrimiento" (FO/D) and "Learning Together" (LT). Cooperative group size ranged from two to six students. A total of 29 third- through sixth-grade groups in 7 different classes were observed. Three of the seven classes were engaged in FO/D science lessons; the other four followed the LT format. During each observation, 5 minutes were spent recording communication in each group, and 5 minutes were spent filling out a group evaluation form. Seven categories of communication were identified: (1) social/emotional; (2) procedural supply; (3) information supply; (4) noncategorizable; (5) information request; (6) procedural demand; and (7) procedural request. Discussion of findings focuses on social/emotional communication, supply and demand, informational versus procedural communication, and teacher/student communication. Extensive concluding discussion explores six questions derived from the hypothesis that different types of individual contributions have different values in the interdependent learning situation. (RH)

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COMMUNICATION IN COOPERATIVE LEARNING GROUPS

-presented at AERA conference, New Orleans, 1988

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Because the communication in cooperative learning groups has been assumed to mediate the improved ethnic relations, enhcanced self-esteem, and increased academic achievement that result from such groups, I have analyzed this communication and generated several questions about how it may bring about some of cooperative learning's positive effects. From manual recordings and analysis of the communication of twenty-nine "Finding Out/Descubrimiento" and "Learning Together" groups in a mixed-ethnicity, working-class school, I have generated hypotheses and questions about how improved self-esteem and ethnic relations and increased academic achievement may result from cooperative learning groups. [1]

Cooperative learning may be used as an alternative to, or in conjunction with, the traditional approach to education in which students compete against each other for attention and recognition from the teacher. In cooperative learning groups, students are not only allowed but encouraged to assist each other in their learning. Cooperative learning is growing rapidly in popularity. According to Dishon and Wilson (1984: vii), "Tens-of-thousands of teachers throughout North America are now beginning to utilize cooperative learning strategies in their classrooms."

Cooperative learning groups are normally structured to be heterogeneous in terms of ability, race, ethnicity, and gender. Students of all abilities and backgrounds, and traditionally low-achieving students in particular, show increased academic achievement after participating in cooperative learning groups, while simultaneously gaining in self-esteem and in respect for persons who differ from themselves.

Research on cooperative learning methods has been accumulating rapidly during the past decade. Except for improved perceptions of females, which have only recently been studied for the first time (Johnson, Johnson, & Stanne, 1986), all of the following effects have been widely replicated: improved academic achievement (e.g. Slavin, 1983a, 1983b, Johnson, Maruyama, Johnson, Nelson, and Skon, 1981); improved ethnic relations (e.g. Johnson, Johnson, and Maruyama, 1983, Slavin, 1983b); increased mutual concern and self-esteem (e.g. Slavin, 1983b); and increased acceptance of handicappped students (e.g. Slavin, 1983b; Johnson, Johnson, Lew, and Mesch, 1986).

Perhaps because cooperative learning methodology is relatively new, attention has focused more on its effects than on the mechanisms by which these effects come about. What speculations have been made about effect mechanisms have centered primarily on communication. First, Sharan (1980) ventured to say that communication in cooperative groups mediated their positive effects; then Webb (1982b) determined that tutoring in cooperative groups was more highly associated with increased achievement than being tutored; and most recently, Slavin has suggested that perhaps children learn better from each other because they share and better understand the language of "kid talk" (personal communication, 1986). Slavin has also

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[1]Academic achievement and social effects measures were not included in this study. These groups may or may not actually have had the predicted cooperative learning effects. The generalizability of the communication taxonomy generated herein should be tested in future research.

hypothesized that positive reward interdependence --in which group members cannot be rewarded without the positive input of other group members-- enhances perceptions of self and others by increasing the value of individual contributions in the classroom, which in turn enhance academic achievement (1983b).

In this research, I have pursued the hypothesis that cooperative learning group communication is a mediator of cooperative learning's effects, and have analyzed cooperative communication in terms of Slavin's concept of individual contribution value. From hand-recorded accounts of children's
verbal and nonverbal exchanges in cooperative learning groups, I have developed a working taxonomy of cooperative learning group communication. This taxonomy has served as the basis for the generation of implications regarding the effects of increased self-esteem and improved ethnic relations.

COOPERATIVE LEARNING AT GARFIELD[2] SCHOOL

A case-study of one elementary school which was initiating implemention of cooperative learning on a broad scale was chosen as a rich starting ground for exploration of cooperative learning group communication. The school chosen was Garfield School in Cedar City, a public school in a working-class neighborhood. Garfield's population was approximately 45% Anglo, 45% Hispanic, and 10% other minority at the time of the study. Students' achievement scores were mostly low to average. Since cooperative learning seems to improve ethnic relations, self-esteem, and academic achievement, Garfield was an excellent candidate for a two-year, schoolwide teacher training program in cooperative learning techniques.

Half of Garfield's teachers were learning to use cooperative learning during this study. These teachers taught using traditional teaching strategies most of the time and taught an average of three cooperative learning lessons per week. Teachers were trained in the use of the cooperative learning methodologies of "Finding Out/Descubrimiento" (FO/D) (Cohen & Intili, 1981; DeAvila & Duncan, 1980) and "Learning Together" (Johnson & Johnson, 1975). These methods were used with approximately equal frequency.

FO/D is a bilingual science and math program, but Garfield teachers used only the FO/D science curriculum during this study. In FO/D, teachers assign group members roles to maximize their individual skills. The roles of reporter, facilitator, recorder, reader, checker, and safety are assigned on an alternating basis. Cooperative norms are stressed by the teacher and ideally by the students as well. Science lessons consist of each group carrying out a different experiment by

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[2]Pseudonyms are used throughout this paper.

following instructions written in Spanish and English on cards included in the curricular materials. Group reporters describe the experiments and their results to the class after the experiments are completed. Students in "Learning Together" groups are not assigned roles. Johnson and Johnson methodology includes whole class training in basic group skills, e.g. communicating clearly, giving feedback, paraphrasing, etc. The Johnsons' strategy is not limited to any particular subject matter and may be adapted by the individual teacher as s/he wishes. As in FO/D, cooperative norms are stressed by the teacher and ideally by the students as well.

Cooperative group size at Garfield ranged from two to six students. Groups were usually mixed ethnically and by gender. Roles and cooperative skills were emphasized to varying degrees. Teachers usually began their cooperative lessons with a mini-lesson in the traditional didactic format. In these mini-lessons students were given information and questioned about the topic at hand, and/or were given basic procedural instructions and perhaps academic and social goals to work toward, e.g. "learn how a magnet works" (academic) and "listen to others" (social).

Often hand-made posters displaying cooperative slogans, definitions of group member roles, and group norms were displayed in Garfield's cooperative classrooms. There was usually a Spanish and an English version of each poster. An FO/D cooperative slogan displayed in almost every classroom read, "No one is good at everything, but everyone is good at something." The following group norms from the FO/D curriculum were posted in many of the rooms:

> Show respect for yourself and others.
> Be responsible for your own learning behavior.
> You have the right to ask for help and the duty to give help.
> No one is done until every group member is finished.

METHODOLOGY

I observed twenty-nine third- through sixth-grade groups in seven different classes. Three of the seven classes were engaged in Finding Out/Descubrimiento lessons. The other four followed a Johnson and Johnson format. FO/D lessons were observed in third, fifth, and sixth grade classes. Johnson and Johnson lessons in third/fourth, fifth/sixth, fifth, and sixth grade classes were observed.

Five minutes were spent recording communication in each group and five were spent filling out a group evaluation form. (I assisted in a qualitative program evaluation in exchange

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[3]I use both definitions of the word communication throughout this analysis: communication as the act of transmitting, giving, or exchanging information, signals, or messages by talk, gestures, or writing, and communication as the information, messages or signals themselves.

for access to the data.) Fortunately, hand-written notes were sufficient for recording verbatim accounts of almost all verbal communications as well as prominent nonverbal communications[3]. (Tape recorders were not used to avoid excessive reactivity and because of financial and time limitations.)

DATA ANALYSIS

The three categories I used to guide initial analysis of Garfield's cooperative groups were generated by Noddings et al (1981) in an analysis of mathematical problem-solving groups. These categories are: informing/problem, ritual/procedure, and feeling. Initially I also attempted to code each communication as verbal or nonverbal.

Glaser's constant comparative method was used to modify and validate categories. This method entails shifting between explicit coding of data and inspection for new properties of theoretical categories which are recorded in memos. Its phases, all of which remain in operation throughout analysis, are "(1) comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting the theory, and (4) writing the theory" (Glaser & Strauss, 1967: 220).

COMMUNICATION IN GARFIELD SCHOOL COOPERATIVE LEARNING GROUPS

The "feeling," "information/problem," and "ritual/procedure" categories mutated in this analysis into the following. By descending frequency of occurrence, the communication in the cooperative groups consisted of: "social/emotional communication" (29% of all observed communications), "procedural supply"(27%), "information supply" (21%), "noncategorizable"(8%), "information request"(7%), "procedural demand"(5%), and "procedural request"(4%). (These percentages sum to 101% due to rounding error.) Each category is defined in Chart A below. (How they differ and what is significant about them will be clarified later in this analysis.)

CHART A: TAXONOMY OF PRIMARY COMMUNICATIONS

SOCIAL/EMOTIONAL (29%): *any communication whose outstanding characteristic was not informational or procedural, but rather social or emotional in nature. Subsumed under this heading are dominating remarks, requests for attention, e.g. "Look at me!," off-task behavior, positive and negative commentary regarding the task at hand, etc. (The social/emotional category actually consists of 33 smaller categories, each one occurirng at a frequency of 4% of all communications or less. These categories are listed in Chart B.)*

PROCEDURAL SUPPLY (27%): *the supply of information which is equally/easily accessible by each group member, and usually mundane in nature, to one or more other group members, e.g. reading an instruction from*

an instruction sheet, or, in its nonverbal form, an easily observable gesture which in some way contributes to the group's achievement of its goal, e.g. someone handing someone else an instruction sheet to read.
INFORMATION SUPPLY (21%): *the supply of information not necessarily accessible to or held by each group member, usually but not always academic in nature, to one or more other group members, e.g. "That's the equator".*
NONCATEGORIZABLE (8%): *words or actions which could not be understood because they were inaudible, or garbled, or whose meaning were unclear due to lack of context or other unheard communications, e.g. "This is it," said without any observable indication to explain what "it" was.*
INFORMATION REQUEST (7%): *a request for information probably not equally accessible or held by each group member, usually but not always academic in nature, e.g. "What countries are these?"*
PROCEDURAL DEMAND (5%): *a demand for information equally/easily accessible by each group member, distinguished from a request by its imperative nature, e.g. "Paul, Look up Warsaw".*
PRODEDURAL REQUEST (4%): *a request for information equally/ easily accessible by each group member, e.g. "Is there another green pen?"*

Discussion

Social and emotional communication was by far the most frequently occurring type of communication. Although initially coded as "feeling, " it quickly became apparent that some social communications were not obviously "feeling" in nature, such as neutral commentaries and opinion solicitations. Initial data coding revealed that social/emotional was a problematic communication category, because every communication seemed to have a social and/or emotional component. The choice of where to direct a question or comment, whether or not to respond to a question or comment, and the tone of voice of any question or comment all have underlying social and emotional components. Thus only communications that seemed to be predominantly social and/or emotional were categorized as social/emotional.

Another aspect of cooperative group communication that became clear during initial observations was that verbal and nonverbal were not useful categories to apply, in that every communication had a nonverbal component. An attempt was made to eliminate this problem by categorizing only exclusively nonverbal communications (communications with no verbal component) as such, but even this was problematic--children (and adults, for that matter) are continuously communicating nonverbally, if only through body posture or facial expression, and these communications are very difficult to interpret without intimate understanding of both the individual and the context. In addition, one observer cannot possibly record the continuous nonverbal interaction of several children manually. The result of this difficulty was that only very obvious and discrete nonverbal communications were recorded. Finally, however, these

nonverbal contributions to group process were realized to belong within the broader category of procedural supply.

After wrestling with the initial difficulties of the social/emotional and verbal/nonverbal categories, coding became relatively straightforward. The category of informing/problem was broadened to include information supply and information request. The ritual/procedure category was broadened to include procedural supply, request, and demand. All other communications fell into either the social/emotional or noncategorizable categories. Hence the taxonomy of seven primary categories in Chart A was generated to describe the cooperative group communication.

Social/emotional comunication

Although social and emotional communications may have important implications for the outcomes of improved ethnic relations and self-esteem, their complexity precluded meaningful hypothesis generation in this regard. Because social and emotional communications varied widely, an attempt was made at first to identify them more specifically, as "negative affect," "not acquiescing to a demand," "attention request," "positive affect," or similarly specific categories. This left me with thirty-three categories, which, for the purposes of this analysis, were collapsed into a single social/emotional category after all, thirty-three being a rather unwieldy number. A happy medium, in which just a few categories are used to describe the communications, may eventually be the most useful grain of analysis. For interest's sake, the thirty-three original social/emotional categories are listed individually in Chart B.

CHART B: INDIVIDUAL SOCIAL/EMOTIONAL CATEGORIES

POSITIVE AFFECT
NEGATIVE AFFECT
POSTIVE COMMENTARY
NEGATIVE COMMENTARY
NEUTRAL COMMENTARY
SOLICIT OPINION
RESPONSE TO OPINION SOLICIT
PROCEDURAL OFFER
NONVERBAL NON-CONTRIBUTE
REQUEST TO BORROW (non-procedural)
SELF-TALK
OFF-TASK
IMITATE PEER
SUGGESTION OF PROBLEM RESOLUTION
PROTECT
PEER RESPONSIBILITY
LEAD
ORDER
DOMINATE
DEMAND INVOLVEMENT
ACQUIESCE TO DEMAND FOR INVOLVEMENT
REQUEST INVOLVEMENT
PHYSICAL AGGRESSION
SELF-DEFENSE
CHASE
PEER PRESSURE
ACQUIESCE
DON'T ACQUIESCE
SOLICIT AUTHORITY
REJECT PROCEDURAL DEMAND
COMPETE

GROUP RESPONSIBILITY
SPANISH (SPANISH WAS USED VERY RARELY, AND SEEMED TO BE USED ONLY FOR SOCIAL PURPOSES OR TO SATISFY THE TEACHER)

Supply and demand[5]

The second and third most frequently occurring categories, respectively, were procedural supply and information supply, respectively. I will discuss how the distinctions between these matter shortly, but first they shall be examined together. It is interesting that these communications, which are similar in that they consist of "giving," occurred far more frequently than the requests or demands for them. "Giving" comprised approximately 48% of all categorizable communication, whereas requesting and demanding comprised only approximately 16%. In other words, studentsreceived more than they asked for by a ratio of approximately three to one. (Non-statistical analysis showed that this occurred in all the observed classes and across race and gender.)

This three-to-one supply/demand ratio applied to the individual categories of information supply (21% of all categorizable communications) and information request (7%), and procedural supply (27%) and procedural request/demand (9%) as well. The significance of this will be discussed in the analysis section to follow.

Informational vs. procedural communication

In order to discuss the significance of and distinctions between the informational and procedural categories, the following interaction sequences from several groups' communication will be used. The groups communicating in these examples are representative in that one is a Johnson and Johnson group and one is a Finding Out/Descubrimiento group; one class was taught by a female and one by a male teacher; and one of the groups was in a lower elementary grade class (3/4th grade) while the other was in an upper elementary grade class (5th grade). They are also representative because each contains at least one Hispanic and one Anglo child[6]. (Although not every cooperative learning group at Garfield School reflects this composition, most do, since they are the two dominant ethnic types.)

Group 1 (female teacher, third/fourth grade class, Johnson & Johnson groups)

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[5]Demand includes both requests and demands for the purposes of broad analysis.

[6] Of the 110 children I observed, 52 (47%) were Hispanic, 45 (41%) were Caucasian, 9 (8%) were Black, 2 (2%) were Asian, 1 (1%) was Mulatto, and 1 (1%) Indian.These attributions are based on appearance, language use (Spanish accents reinforced attributions of Hispanic ethnicity) and names. Although the ethnic distribution I arrived at matches the school's overall distribution, it is undoubtedly flawed. However, ethnicity is not a critical distinction in this study.

Three children (one Hispanic girl, one Anglo boy, and one Asian boy) have before them the task of completing a geography worksheet:
Josh (Anglo boy): We only have three people in our group. Alma's supposed to be in our group. Where is she?
Esmerelda (Hispanic girl): She's not here.
Jimmy (Asian boy): *(reading instructions from a worksheet)* Go back and check each item. Draw the equator. *(He looks at the book in front of him, stands up,and points at the page.)* What countries are these?
Esmerelda *gets up and walks to a nearby desk. She picks up a sweater from the chair and puts it on. She begins rummaging through the desk.*
Josh *(stands up and looks around the room. He joins Jimmy in looking at the book.)* There's a whole bunch of lines that goes across the world.
Jimmy: I know, but that's the equator. (He indicates with his finger.)
Josh *(walks over to the teacher's desk, which is directly adjacent to the group's working area. He looks at a Petri dish on the desk, which contains an organism of some sort.)* It's still alive.
Jimmy *joins Josh in looking at the dish, then returns to the group's working area.*
Esmerelda *(returns to the working area as well. She is brushing her hair.)* I'll write 'the equator'. I'LL WRITE. *(She begins rereading the directions aloud.)* Draw the equator and label it. Label each continent on your paper.

Group 2 (male teacher, fifth grade, Finding Out/Descubrimiento groups)

An Anglo boy and two Hispanic girls are conducting a science experiment.

Edward (Anglo boy): I have to check this out. *(He feels a white powdery substance in a plastic bag. He looks at Silvia, one of the two Hispanic girls.)* What is this? This is really soft.
Silvia *feels the substance.*
Edward: This is really weird, huh? *(to Linda:)* Feel it. It makes your hand feel soft.
Linda *sits with her chin in her hand, ignoring Edward.*
Silvia *standing, tries to light a match.*
Edward: Watch out for the match. Don't catch your hand on fire. Let me do it.
Silvia, *laughing, tries several more times to light the match. Without having lit one, she throws the matches down on the desk.*
Edward: *(to a girl passing by the group)* C'mon, join the fun. *(He tries to light the match.)*
Teacher: Quien es el facilitador? (Who is the facilitator?)
Silvia: El es el facilitador. (He is the facilitator.)
Edward *(lights the match, and lights a candle with it.)* We did it both ways. We have to get the other thing.
Silvia *(looks through the basket of materials.)* It's not here.
Edward *(comes to the basket and looks. He takes a clothespin from Silvia, clips it onto a cupcake holder, and holds it over the candle.)* How long do we have to do it?
Linda *hands the direction sheet to Silvia.*

The communication of each of these two groups, like almost all the groups in this

sample, was characterized by a great deal of information supply (see definition in Chart A). Examples of information supply from group one are: "She's not here"; "There's a whole bunch of lines that goes across the world"; and "I know, but that's the equator". In group two, "This is really soft"; "Makes your hand feel soft"; "We did it both ways"; and "It's not here" supply information. This is not to say that other communications do not supply information as well. Every communication supplies some kind of information, e.g. Linda's unspoken refusal to feel the powder may communicate that she is disinterested, or angry at Arturo, or hasn't heard him, or something else yet. Communications coded specifically as information supply differed from other communications in that their central function was the explicit sharing of some piece of information which was content-oriented and/or reflective of the communicator's knowledge of some fact not necessarily accessible to each group member.

"Procedural supplies" also provide information, but of a more mundane, mechanical nature. They tend to provide information regarding the mechanics of the task at hand, as opposed to demonstrating some piece of knowledge or understanding on the part of the communicator. Examples of procedural supply from the above groups are, "We only have three people in our group"; "Alma's supposed to be in our group"; and "We have to get the other thing". Linda's handing of the direction sheet to Silvia in Group Two was also designated as procedural supply because it is a mechanical supply of information from one student to another. "Go back and check each item"; "Draw the equator"; "Draw the equator and label it"; and "Label each continent on your paper" are all procedural because they were read from the instructions. Everyone in the group had access to them; Esmereida did not demonstrate unique knowledge when she read these directions aloud in Group One.

The distinction between the categories of informational and procedural supply may seem a bit fuzzy. As it is key to later analysis, I will attempt to clarify this distinction here, by way of examples which fall on the borderline between the categories. "She's not here" is an example of information supply, whereas "We only have three people in our group" and "Alma's supposed to be in our group" are examples of procedural supply. The difference is that "We only have three people in our group" and "Alma's supposed to be in our group" are presumably pieces of procedural information that everyone in the group has access to--Josh most likely has not indicated any unique understanding with these two statments. Anyone might have made them. (Anyone might have looked around the group and noticed that someone was missing. Of course, the fact that Josh chose to do so does indicate something unique about him, but I suggest that it is less unique than the knowledge required for Alma to say, "She's not here," for example, for reasons I am about to expound.) The reader may suspect that anyone might also have made the statement "She's not here" in much the same way that anyone might have said "Alma's supposed

to be in our group". But I as observer took the liberty of interpreting Esmerelda's statement to mean, "Alma is ABSENT today; she will not be joining our group"[7] -- information which Josh may well not have acquired as of 10:45 on this Monday morning, or heard earlier but forgot. Thus Esmerelda's unique, private knowledge was used, and her statement was categorized differently from Josh's, although they are very similar.

Teacher/student communication

Although this study was aimed at explicating the communication within cooperative learning groups, communication between students and teachers was observed as well. One example of teacher communication in cooperative learning (or, in a sense, the absence thereof) will be included here and analyzed later:

> Group 3: Three girls (two Anglo, one Black) and a boy (Hispanic) in a fifth/sixth grade class are creating a St. Patrick's Day mural.
>
> Arturo (Hispanic boy): We're never gonna finish. Just because of Patricia. Come on Patricia.
> Patricia (Anglo girl) *sits idly by.*
> Sibyl (Black girl): Contribute!
> Arturo: Mr. Walker, Patricia won't do anything.
> *(The teacher appears to ignore Arturo's plea.)*
> Patricia mumbles incoherently.
> Arturo: Draw clouds!
> Patricia continues to sit idly.
> Sibyl: Is that how you spell Saint?
> Patricia: Ess, tee. Just write ess, tee.

One can infer from the above that Patricia's contribution occurred in response to peer pressure rather than teacher pressure, since the teacher did not intervene. The potential significance of this will be discussed later.

HYPOTHESES AND QUESTIONS: IS THE DEGREE TO WHICH THE INFORMATION SUPPLIED REFLECTS THE INDIVIDUAL'S UNIQUE CAPACITIES OR UNDERSTANDING IMPORTANT?

Slavin has suggested that reward interdependence probably enhances perceptions of self and others by increasing the value of individual contributions in the classroom, which in turn

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[7] I make this interpretation based upon the tone in Esmerelda's and Josh's voices and on my own experience teaching and as a student.

enhance academic achievement (1983). The division of types of contributions made in cooperative learning groups in this study bring light to the possibility that different types of contributions are differentially associated with specific outcomes. Perhaps different types of individual contributions have different values in the interdependent situation. The following questions were based upon this hypothesis, and will be considered here: Does the value of a given contribution have implications for the degrees of increases in self-esteem, mutual respect, and academic achievement? What is the value of social and emotional communication? What is the value of informational versus procedural information? How are the ratios of supply versus demand important to the value attributed by students to a given communication? Does a requested or demanded contribution by a participant attribute more status to that participant than a nonrequested piece of information or contribution? What is the value of a contribution achieved by peer pressure compared with the value of a contribution mandated by a teacher? Does the concept of contribution value have implications for the implementation of cooperative learning? These questions are addressed below.

1. Does the value of a given contribution have implications for the degree of increase in self-esteem, mutual respect, and academic achievement?

One reason that the positive aspects of cooperative learning groups may come about is that individuals are able to demonstrate unique knowledge or contribution capacities in communication with their groups. Since there is a tendency for the self-concept to emphasize personally distinctive aspects (McGuire & Padawer-Singer, 1976), it may be important to consider the degree to which the communication categories discovered in this study vary in their emphasis on the personally distinctive aspects of the communicator. Perhaps this degree of emphasis determines the value of the communications. It may be that the more the communication emphasizes a unique characteristic which is positively valued by students, the more the communicator's status in the groups (positive perception by others) and self-esteem are likely to increase. Such status and self-esteem increases may in turn help to increase academic achievement.

2. What is the value of social and emotional communication?

Social and emotional communication, given its frequency at Garfield, may be a very important source of cooperative learning effects. Using a purely intuitive basis for speculation, I suggest that social and emotional communication is a key medium through which cooperative learning's positive social/psychological effects take place. If this is true, social and emotional

communication should be studied more carefully to determine what its major categories are. Perhaps "positive" social and emotional communications, i. e. friendly and self-confident ones, are most likely to increase respect for a given individual in the eyes of others as well as the self, the opposite being the case for "negative" social and emotional communications.

3. What is the value of informational versus procedural information?

The distinction between informational supply and procedural supply may be an important one for theorizing about how self-esteem and ethnic relations improve as well as for theorizing about how academic achievment improves.

Procedural information was not only requested but demanded as well. Non-procedural information was never demanded, perhaps because it can never be assumed that anyone in a given group is able to supply such information. Perhaps students value non-procedural information more because it cannot be demanded. Furthermore, procedural information is less "precious"; it was offered more often in Garfield groups. If this is the case, perhaps non-procedural information supply is most likely to increase respect for a given individual in the eyes of others as well as the self, the opposite being the case for procedural information supply. Furthermore, both types of contributions may increase academic achievement simply by virtue of conveying information and furthering the learning process.

4. How are the ratios of supply versus demand important to the value attributed by students to a given communication? Does a piece of information or contribution that has been requested or demanded attribute more status to a participant than a nonrequested piece of information or contribution?

It is not clear what exactly was meant by "helping" in the cooperative learning groups studied by Webb (1982b; 1983), but since helping was significantly correlated with academic achievement in Webb's studies, perhaps the supply of information in general is associated with positive cooperative learning group outcomes, be they academic or otherwise.

Webb (1982b) determined that giving explanations, receiving explanations, and not receiving explanations when they were requested were the best predictors of achievement. Giving and receiving explanations was positively correlated with achievement, and not receiving requested explanations was negatively correlated with achievement. Perhaps parallel correlations exist between asking for and/or demanding specific types of information, receiving information, and self-esteem and ethnic relations. Several hypotheses may be generated with respect to these variables based upon Webb's finding: (1) The supply of procedural and non-procedural information by an individual may correlate with a positive perception of that individual by the self

and others. 2) The receipt of procedural and non-procedural information by an individual may correlate with a positive perception of that individual by the self and others. 3) Not receiving requested or demanded information of either type may correlate with a negative perception of that individual by the self and others. Finally, the three-to-one ratio of information and procedural supply versus the demand for them brings to light the possibility that received information that has been requested is valued differentially from received information that has not been requested.

5. What is the value of a contribution achieved by peer pressure compared with the value of a contribution mandated by a teacher?

Teachers may at times be reluctant to try implementing cooperative learning techniques because they fear relinquishing control of their students. My observations suggest that teachers can and should remain an integral part of cooperative learning in the classroom. The Group 3 vignette included earlier offers one small but profound example of how a teacher's skill may positively affect what goes on in a cooperative learning group.

Although Patricia did not contribute manually in the example just mentioned, in spite of her peers' solicitations, she did eventually make a verbal contribution. We cannot know if this would have happened if Mr. Walker had not ignored Arturo. Furthermore, it is impossible to isolate his action as having caused the student behaviors subsequent to it. But we can speculate, at least, as to what might have happened had Mr. Walker intervened. Had he used his authority to demand that Patricia contribute, her contribution might not have been seen as her personal, unique choice, but instead as a behavior engaged in under duress from authority. Instead, by giving Patricia the individual choice to contribute in her own way, he validated her choice to answer Sibyl's information request. Not only Patricia but the other students in her group retained responsibility for her behavior, despite an attempt to resort to the authority of the teacher. As was discussed earlier, the opportunity to contribute to the group in a unique, privately determined way may influence self-esteem differently than contrived or teacher-determined contributions would. It is hoped that future research will explore this possibility.

6. Does the concept of contribution value have implications for the implementation of cooperative learning?

Differences in effects of different cooperative learning methodologies may be at least partly attributable to the degree to which the methods facilitate particular types of communication. Different cooperative learning methodologies may employ different aspects of students' capacities to contibute. Jigsaw groups, in which each member is given some part of a jigsaw puzzle-type conglomeration of information, are contrived to validate each individual's unique capacity to

contribute, because the information each student has is given to her/him (by the teacher) at the outset of groupwork (Aronson, 1978). Slavin groups are also contrived to validate individuals' capacity to contribute, by equalizing the number of points any one student can contribute to the group (through doling out points based on individuals' improvement on their own past performance regardless of achievement level)(1983b). Thus Slavin's students contribute on an abstract, numerical basis. (Except when tutoring each other in order to maximize points, they don't need to supply uniquely held information to each other at all.) FO/D groups determine what students can or should contribute by assigning them roles. Johnson groups, on the other hand, employ each individual's naturally occurring capacity to contribute, although these capacities may be enhanced by training in the areas of constructive feedback, effective question-asking, etc. How reflective each individual's contribution is of her or his unique capacity to contribute is very much a distinguishing characteristic of different cooperative learning methodologies and may affect the value of those contributions, which may in turn have much to do with how the individual's self-esteem develops and how s/he is perceived by other groups members. Allowing group members to contribute in more self-determined ways may increase the self-esteem of those who are most able to contribute more than the self-esteem of the less-able, whereas more contrived methods may better serve to equalize the opportunity to gain in self-esteem among group members.

SUMMARY

Much remains to be discovered regarding the communication in cooperative learning groups and how it is tied to the positive effects of cooperative learning. In particular, how children of different genders, ethnicities, and academic ability levels communicate and respond to different communications remains territory to be explored. Teachers' impact on cooperative learning group communication is yet another potential area of investigation. It is my hope that all of these areas will be explicated and clarified in future research.

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